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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/298,372	04/23/1999	SING BING KANG	DEC99-34	1976

7590 09/10/2003

JP Administration
Legal Departmen, M/S 35
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EXAMINER	
YENKE, BRIAN P	
ART UNIT	**PAPER NUMBER**
2614	23

DATE MAILED: 09/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/298,372	KANG ET AL.	
	Examiner	Art Unit	
	BRIAN P. YENKE	2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *RCE (21 Aug 03)* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *See Continuation Sheet* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2, 4-7, 9-12, 14-17, 19-22 and 25-46* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Continuation of Disposition of Claims: Claims pending in the application are 1-2, 4-7, 9-12, 14-17, 19-22 and 25-46 (claims 3,8,13,18 and 23-24 all being cancelled).

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 21 August 2003 has been entered.

2. Applicant's arguments with respect to the claims have been considered but are not persuasive.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1,2,4-7,9-12,14-17,19-22 and 25-46 rejected under 35 U.S.C. 103(a) as being unpatentable over **Carmeli, US 5,699440 in view of Stein et al., US 6,052,124**.

In considering claims 1, 6, 11, 16 and 21,

Carmeli, discloses a system which tests the performance of at least one electro-optical test devices, which include a light source, test target, lens and an imaging system. The electro-optical system includes a test generator 19, display 18, lens 13 and calibrated camera 12 (Fig 1a/b). A computer 17 which processes the information from system 11 via digitizer 16 (Fig 1a/b), includes a memory (col 5, line 15-23) where a stored database is located, and also includes analysis unit.

1) *the claimed digitizing an image of a blank textureless surface having a uniform illumination* is met by digitizer 16 (Fig 1a/b) which digitizes a blank textureless surface as shown in Fig 10a (col 11, line 11-16)

2) *the claimed from the digitized image, determining pixel intensity drop off caused by a vignetting effect* is met where the system test for vignetting and the pixel drop associated with vignetting, where Fig 10a is an ideal input signal, and Fig 10b is the output signal and the result of vignetting.

However, Carmeli remains silent on computing intrinsic parameters of the camera other than pixel intensity drop off using the determined pixel intensity drop off. Carmeli discloses a system which tests the performance of the system (includes light source, target 14, lens 13 and camera 12) which includes the performances of one or more of the selected devices to the testing device can be either the camera 12, lens 13, target 14 and light source 15, where the other components (non-testing) are high performance pre-calibrated components (col 5, line 12-23). The testing device (e.g. camera) is analyzed by computer 17 which includes an analysis unit for analyzing the performance of the system 11 and in particular of the test device therein. Carmeli,

discloses in Fig 10a which shows a uniform light function 43, and the result illustrated in Fig 10b attributed to vignetting, in order to analyze/evaluate the effect of vignetting. Computer 17 computes the performance/calibration of various functions (col 6, line 10-29) where the database of memory (computer 17) stores pre-calibrated data of the devices/components for proper alignment. The analysis unit (of computer 17) analyzes the digitized image to determine performance of the electro-optical component to be representative of the system and being equal to the product of component performances of each test device and of each pre-calibrated device to determine: a) Modular Transfer Function; b) Contrast Transfer Function; c) Grey Level Linearity; d) Illumination Uniformity; e) Geometrical Distortion; d) Signal to Noise Ratio; e) Transient Response; h) Blemishes; i) Blooming and j) Chromaticity.

A device is tested by comparing a distorted image due to aberrations with the test device, with a theoretical ideal image which would be obtained if the test device were replaced by an equivalent high performance device. Carmeli also discloses the parameters which the device might include where the data is an inherent part of the components specification (col 7, line 49-57). Carmeli discloses inherent parameters which include, aspect ratio, focal length and calibration data to name a few (col 7 line 49 to col 8, line 9).

Carmeli, also discloses that in the reverse situation the analysis can be performed with the specific, limited range of components available to the user who needs to correlate the analysis software within the computer 17 to the range of components actually in his possession. Thus, Carmeli is able to load the parameters of

a selected device onto the database, in the event the particular device is not stored in the database. Carmeli, discloses there are various parameters of the pre-calibrated and tested devices (col 7, line 59 to col 8 line 64), where the camera parameters might include the size of the image, type of video signal standard (EIA, CCIR, PAL, NTSC, etc), aspect ratio, type of imager and pixel size, where the lens specification includes the focal length. This data is used in determining the performance of the system. Thus Carmeli, determines the performance of the system and the tested device, based upon the analyzed digitized image and the stored data for the pre-calibrated devices and thus is able to calibrate the camera or selected test device, which was not done in prior art (col 3, line 5-13).

The examiner incorporates Stein et al., US 6,052,124 which discloses the well known intrinsic parameters related to a camera. Stein discloses in the background that the intrinsic parameters of the camera can be represented by the image's aspect ratio, the skew, principal point, and where focal length is related to the aspect ratio.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify/utilize in Carmeli, which discloses a system for testing the performance of a selected device/system where the device/system's performance is determined based upon an ideal precalibrated device, by using the well known intrinsic parameters of the device (i.e. camera) in calculating the performance of the device/system, since the intrinsic parameters of the device determine it's performance.

In considering claims 2, 7, 12, 17 and 22, the claimed wherein the pixel intensity drop off is also caused by an off-axis pixel projection effect, is met where the pixel intensity drop off can be caused by an off-axis pixel as shown in Fig 9a/b and Fig 11.

In considering claims 4, 9, 14 and 18-19, the claimed wherein the step of computing is dependent on a camera tilt effect is met where the performance of the system/device is calculated/computed based on the alignment step of the image, Fig 2A.

In considering claim 5, 10, 15, 20 and 25, *the claimed computing parameters of a model by minimizing the difference between the digitized image and the model* is met by computer 17 in which the stored database in the memory which stores pre-calibrated components is analyzed by the analyzer (computer 17) after the image is digitized. The digitized image is produced under control of the software stored in computer 17 (col 6, line 48-50) which selects from the database the corresponding standard pre-calibrated components whose physical and optical data are known. Then once the image is formed/digitized, the analyzer is able to determine the resulting performance of a test device or the product of the performances and then displayed (Fig 2a-d).

In considering claim 26, 31 and 41, *the claimed wherein the intrinsic parameter is selected from the group consisting of focal length, principal point, skew and aspect ratio.*

As stated above, Carmeli remains silent on computing intrinsic parameters of the camera other than pixel intensity drop off by using the pixel intensity drop off.

However, Carmeli does disclose Carmeli discloses a system which tests the performance of the system (includes light source, target 14, lens 13 and camera 12) which includes the performances of one or more of the selected devices to the testing device can be either the camera 12, lens 13, target 14 and light source 15, where the other components (non-testing) are high performance pre-calibrated components (col 5, line 12-23). The testing device (e.g. camera) is analyzed by computer 17 which includes an analysis unit for analyzing the performance of the system 11 and in particular of the test device therein. Carmeli, discloses in Fig 10a which shows a uniform light function 43, and the result illustrated in Fig 10b attributed to vignetting, in order to analyze/evaluate the effect of vignetting. Computer 17 computes the performance/calibration of various functions (col 6, line 10-29) where the database of memory (computer 17) stores pre-calibrated data of the devices/components for proper alignment. The analysis unit (of computer 17) analyzes the digitized image to determine performance of the electro-optical component to be representative of the system and being equal to the product of component performances of each test device and of each pre-calibrated device to determine:

a) Modular Transfer Function; b) Contrast Transfer Function; c) Grey Level Linearity; d) Illumination Uniformity; e) Geometrical Distortion; d) Signal to Noise Ratio; e) Transient Response; h) Blemishes; i) Blooming and j) Chromaticity.

Carmeli also discloses the parameters which the device might include where the data is an inherent part of the components specification (col 7, line 49-57). Carmeli discloses inherent parameters which include, aspect ratio, focal length and calibration data to name a few (col 7 line 49 to col 8, line 9).

The examiner incorporates Stein et al., US 6,052,124 which discloses the well known intrinsic parameters related to a camera. Stein discloses in the background that the intrinsic parameters of the camera can be represented by the image's aspect ratio, the skew, principal point, and where focal length is related to the aspect ratio.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify/utilize in Carmeli, which discloses a system for testing the performance of a selected device/system where the device/system's performance is determined based upon an ideal precalibrated device, by using the well known intrinsic parameters of the device (i.e. camera) in calculating the performance of the device/system, since the intrinsic parameters of the device determine it's performance.

In considering claims 27, 32 and 42, *the claimed wherein the intrinsic parameter is focal length* REFER TO CLAIM 26 ABOVE.

In considering claims 28, 33 and 43, *the claimed wherein the intrinsic parameter is principal point* REFER TO CLAIM 26 ABOVE.

In considering claims 29, 34 and 44, *the claimed wherein the intrinsic parameter is skew* REFER TO CLAIM 26 ABOVE.

In considering claims 30, 35 and 45, *the claimed wherein the intrinsic parameter is aspect ratio* REFER TO CLAIM 26 ABOVE.

In considering claim 46,

1) *the claimed digitizing an image of a blank textureless surface having a uniform illumination* is met by digitizer 16 (Fig 1a/b) which digitizes a blank textureless surface as shown in Fig 10a (col 11, line 11-16)

2) *the claimed from the digitized image, determining pixel intensity drop off caused by a vignetting effect* is met where the system test for vignetting and the pixel drop associated with vignetting, where Fig 10a is an ideal input signal, and Fig 10b is the output signal and the result of vignetting.

However, Carmeli does not specifically disclose, computing the focal length of the camera using the determined pixel intensity drop off.

Carmeli discloses a system which tests the performance of the system (includes light source, target 14, lens 13 and camera 12) which includes the performances of one or more of the selected devices to the testing device can be either the camera 12, lens 13, target 14 and light source 15, where the other components (non-testing) are high performance pre-calibrated components (col 5, line 12-23). The testing device (e.g. camera) is analyzed by computer 17 which includes an analysis unit for analyzing the performance of the system 11 and in particular of the test device therein. Carmeli, discloses in Fig 10a which shows a uniform light function 43, and the result illustrated in Fig 10b attributed to vignetting, in order to analyze/evaluate the effect of vignetting.

Computer 17 computes the performance/calibration of various functions (col 6, line 10-29) where the database of memory (computer 17) stores pre-calibrated data of the devices/components for proper alignment. The analysis unit (of computer 17) analyzes the digitized image to determine performance of the electro-optical component to be representative of the system and being equal to the product of component performances of each test device and of each pre-calibrated device to determine: a) Modular Transfer Function; b) Contrast Transfer Function; c) Grey Level Linearity; d) Illumination Uniformity; e) Geometrical Distortion; d) Signal to Noise Ratio; e) Transient Response; h) Blemishes; i) Blooming and j) Chromaticity.

Carmeli also discloses the parameters which the device might include where the data is an inherent part of the components specification (col 7, line 49-57). Carmeli discloses inherent parameters which include, aspect ratio, focal length and calibration data to name a few (col 7 line 49 to col 8, line 9).

The examiner incorporates Stein et al., US 6,052,124 which discloses the well known intrinsic parameters related to a camera. Stein discloses in the background that the intrinsic parameters of the camera can be represented by the image's aspect ratio, the skew, principal point, and where focal length is related to the aspect ratio.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify/utilize in Carmeli, which discloses a system for testing the performance of a selected device/system where the device/system's performance is determined based upon an ideal precalibrated device, by using the well known intrinsic parameters (focal length) of the camera in calculating the performance of the camera,

since the focal length is an intrinsic parameters of the camera and thus determines it's performance.

Applicant's Arguments

a) Regarding independent claims 1,6,11,16,21 and 46, the applicant states that Carmeli merely measures the pixel intensity drop off (illumination uniformity), and this is the end result there is no use of that parameter to compute another intrinsic parameter of the camera (such as focal length).

b) Regarding independent claims 1,6,11,16,21 and 46, the applicant states that Stein merely discusses computing intrinsic parameters of the camera through the use of specialized patterns or from more than two views of a scene. Thus, the applicant states there is no reason to combine Stein with Carmeli.

c) Regarding independent claim 11, the applicant states that recites a distinction in terms of a computer system, which patentably distinguishes itself over prior art.

Examiner's Response

a) The examiner disagrees that Carmeli's end result is measuring the pixel intensity drop off (illumination uniformity). Carmeli determines the effects of vignetting (pixel intensity drop off) on a system to determine the performance of at least one electro-optical test device, selected to be the camera 12, lens 13, target 14 and light source 15, where the other components (non-testing) are high performance pre-calibrated components (col 5, line 12-23). As shown in (col 8, line 17-64), Carmeli is (in this instance) testing/calibrating the camera where the other components; reticle, optics and

light source are already calibrated. Thus the effects of the vignetting effect on the system is used to determine/calculate the performance of the system utilizing known pre-calibrated devices. Carmeli's as stated above, computes (computer 17) the performance/calibration of various functions (col 6, line 10-29) where the database of memory (computer 17) stores pre-calibrated data of the devices/components for proper alignment. The analysis unit (of computer 17) analyzes the digitized image to determine performance of the electro-optical component to be representative of the system and being equal to the product of component performances of each test device and of each pre-calibrated device to determine:

a) Modular Transfer Function; b) Contrast Transfer Function; c) Grey Level Linearity; d) Illumination Uniformity; e) Geometrical Distortion; d) Signal to Noise Ratio; e) Transient Response; h) Blemishes; i) Blooming and j) Chromaticity.

A device is tested by comparing a distorted image due to aberrations with the test device, with a theoretical ideal image which would be obtained if the test device were replaced by an equivalent high performance device. Carmeli also discloses the parameters which the device might include, where the data is an inherent part of the components specification (col 7, line 49-57). Carmeli discloses inherent parameters which include, aspect ratio, focal length and calibration data to name a few (col 7 line 49 to col 8, line 9).

It should also be noted that once an element is calibrated, that element's parameters would be used in the analysis of the next performance/test (i.e. if the

camera is the element that has been calibrated, that calibrated data would be used in determining the performance of the selected element in the system).

Also, as stated by Carmeli, some of the shortcomings of prior art include, no absolute calibration of the television camera (col 3, line 8-10). Thus Carmeli provides a system which can test the performance the system and/or of a component thereof, in order to provide greater accuracy and ease of measurement than provided in previous proposed methods/system.

Therefore in order to determine the performance of the system/component and to calibrate the camera, it would be obvious to use the inherent/intrinsic parameters of the camera, since the intrinsic/inherent parameters of a camera determine it's performance and would be needed for calibration.

b) The examiner disagrees there is no motivation to combine Stein with Carmeli. As stated above (examiner's comments (a)), Carmeli discloses a system which tests the performance of a system/component which are used to calibrate the tested component/non-calibrated device, a camera in this instance. Stein was relied upon by the examiner, to illustrate that a camera has intrinsic parameters such as the image's aspect ratio, the skew, principal point, and where focal length is related to the aspect ratio.

Carmeli does disclose there are various parameters of the pre-calibrated and tested devices (col 7, line 59 to col 8 line 64), where the camera parameters might include the size of the image, type of video signal standard (EIA, CCIR, PAL, NTSC,

etc), aspect ratio, type of imager and pixel size, where the lens specification includes the focal length.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Carmeli which discloses a system for testing the performance of the system/component where the selected component(s) being tested is uncalibrated being compared to ideal precalibrated devices, by using the intrinsic parameters of a camera as taught by Stein, since the intrinsic parameters of a camera are needed for calibration and determine it's performance.

c) The examiner disagrees. Carmeli discloses a computer 17 which controls the analysis unit therein and also evaluates the different performance parameters of the electro-optical system 11. Thus Carmeli discloses a system which utilizes a computer to control and evaluate the electro-optical system.

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian Yenke whose telephone number is (703) 305-9871. The examiner work schedule is Monday-Thursday, 0730-1830 hrs.

5. If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisor, John W. Miller, can be reached at (703)305-4795.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 872-9314

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is\ (703)305-4700.

BRIAN P. YENKE
Patent Examiner
Art Unit 2614

B.P.Y
September 9, 2003